# CERTIFICATE OF TRANSLATION

As a below named translator, I hereby declare that my residence and citizenship are as stated below next to my name and I hereby certify that I am conversant with both the English and Korean languages and the document enclosed herewith is a true English translation of the Korean patent application No. 2000-70099 filed on November 23, 2000.

**NAME OF THE TRANSLATOR** : Yun-Jeong LEE

**SIGNATURE** : Lee Yun Jeong

**Date** : February 7, 2007

**RESIDENCE** : MIHWA BLDG., 110-2, MYONGRYUN-DONG 4-GA, CHONGRO-GU, SEOUL 110-524, KOREA

**CITIZENSHIP** : REPUBLIC OF KOREA

*Translation of Priority Document*

# THE KOREAN INTELLECTUAL PROPERTY OFFICE

This is to certify that annexed hereto is a true copy from the records of the Korean Intellectual Property Office of the following application as filed.

Application Number : Korean Patent Application No. 2000-70099

Date of Application : November 23, 2000

Applicant(s) : Samsung Electronics Co., Ltd.

**COMMISSIONER**

# [ABSTRACT OF THE DISCLOSUSRE]

## [ABSTRACT]

The present invention relates to a method for allocating a common channel, i.e., a random access channel (RACH), a common packet channel (CPCH) or a forward access channel (FACH), and more particularly to a method for allocating an adequate common channel among different type of common channels based on the service request and the quality of service.

## [REPRESENTATIVE FIGURE]

FIGURE 2

## [INDEX]

CDMA, UMTS, Common Channel, RACH, CPCH, FACH

# [SPECIFICATION]

## [TITLE OF THE INVENTION]

METHOD FOR ALLOCATION OF COMMON CHANNEL IN CDMA COMMUNICATION SYSTEM

## [BRIEF DESCRIPTION OF THE DRAWINGS]

FIG. 1 illustrates a layer structure of a UE according to an embodiment of the present invention;

FIG. 2 illustrates a procedure for transmitting service parameters by an SRNC according to a first embodiment of the present invention;

FIG. 3 illustrates a method for allocating a channel by a DRNC according to the first embodiment of the present invention;

FIG. 4 illustrates a procedure for transmitting service parameters by the SRNC according to a second embodiment of the present invention; and

FIG. 5 illustrates a method for allocating a channel by the DRNC according to the second embodiment of the present invention.

## [DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT]

## [OBJECT OF THE INVENTION]

## [RELATED FIELD AND PRIOR ART OF THE INVENTION]

The present invention relates generally to a method for allocating a common channel in a CDMA (Code Division Multiple Access) mobile communication system, and in particular, to a method for allocating a common channel in the case that a serving radio network controller (SRNC) is different

from a drift radio network controller (DRNC).

With the rapid development of the mobile communication industry, a future mobile communication system will provide not only a voice (circuit) service but also advanced services such as a data service and an image service. Generally, the future mobile communication system employs a CDMA (Code Division Multiple Access) system, and the CDMA system is classified into a synchronous system and an asynchronous system. The synchronous system is chiefly adopted in United States, while the asynchronous system is mainly adopted in Europe and Japan. However, the standardization work on the future mobile communication system is being separately carried out for the synchronous system and the asynchronous system. The European future mobile communication system is called "UMTS (Universal Mobile Telecommunication System)".

The standardization work provides various specifications for the data service and the images service as well as the voice service, required in the future mobile communication system, and particularly, for channel allocation.

A UMTS W-CDMA (Wideband Code Division Multiple Access) communication system, the European future mobile communication system, uses a random access channel (RACH) and a common packet channel (CPCH) as a reverse common channel, and uses a forward access channel (FACH) as a forward common channel.

Among the reverse common channels of the W-CDMA communication system, the RACH can have characteristics being dependent on a TTI (Transmit Time Interval) and a channel coding mode, and is mapped with a physical random access channel (PRACH) on a one-to-one basis. Further, the PRACH can also have characteristics being dependent on available signatures and an access sub-channel. Therefore, the RACHs can be distinguished (identified) based on the TTI and the channel coding mode, while the PRACHs can be distinguished according to the number of available signatures and the access sub-channel. In addition, an available spreading factor (SF) can be also used in distinguishing the PRACHs.

As the RACHs and PRACHs have various characteristics, they can be used for different purposes according to their service types. In addition, information on the RACH/PRACH is broadcast by a Node B, and upon receiving the RACH/PRACH information, a UE can select RACH/PRACH to use depending on the received RACH/PRACH information. Alternatively, the Node B can select RACH/PRACH to be used by a specific UE based on a service to be used by the UE, and then inform the UE of the selected RACH/PRACH.

Like the RACH, the FACH and the CPCH also have different characteristics to provide different services. Alternatively, the Node B can determine the FACH and the CPCH to be used by the UE and then transmit information on the determined FACH and CPCH to the UE.

Meanwhile, the RACH, the FACH and the CPCH are allocated to the UEs by a serving radio network controller (SRNC). The SRNC connected to a core network (CN) exchanges information on service provided between the UE and the CN with the CN. The SRNC determines a channel to be allocated to the UE using the service information transmitted from the CN.

Shown in Tables 1A to 1C are RAB (Radio Access Bearer) parameters of a service information message used by the CN to inform the SRNC of the service information.

Table 1A

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| **RAB parameters** | | | | |
| >Traffic Class | M | | ENUMERATED (conversational, streaming, Interactive, background, ...) | **Desc.**: This IE indicates the type of application for which the Radio Access Bearer service is optimised |
| >RAB Asymmetry Indicator | M | | ENUMERATED (Symmetric bidirectional, Asymmetric Uni directional downlink, Asymmetric Uni directional Uplink, Asymmetric Bidirectional, ...) | **Desc.**: This IE indicates asymmetry or symmetry of the RAB and traffic direction |

Table 1B

| | | | | |
|---|---|---|---|---|
| >Delivery Order | M | | ENUMERATED (delivery order requested, delivery order not requested) | **Desc:** This IE indicates that whether the RAB shall provide in-sequence SDU delivery or not<br>**Usage:**<br>Delivery order requested: in sequence delivery shall be guaranteed by UTRAN on all RAB SDUs<br>Delivery order not requested: in sequence delivery is not required from UTRAN |
| >Maximum SDU size | M | | INTEGER (0..32768) | **Desc.:** This IE indicates the maximum allowed SDU size<br>The unit is: bit.<br>**Usage:**<br>Conditional value: set to largest RAB Subflow Combination compound SDU size when present among the different RAB Subflow Combination |
| >SDU parameters | | 1 to <maxRABSubflows> | See below | **Desc.:** This IE contains the parameters characterizing the RAB SDUs<br>**Usage**<br>Given per subflow with first occurence corresponding to subflow#1 etc• |
| >Transfer Delay | C-iftrafficConv-Stream | | INTEGER (0..65535) | **Desc.:** This IE indicates the maximum delay for 95th percentile of the distribution of delay for all delivered SDUs during the lifetime of a RAB, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP<br>The unit is: millisecond.<br>**Usage:**<br>- |

Table 1C

| | | | | |
|---|---|---|---|---|
| >Traffic Handling priority | C - iftrafficIntera ctiv | | INTEGER (spare (0), highest (1), lowest (14), no priority used (15)) (0?5) | **Desc.:** This IE specifies the relative importance for handling of all SDUs belonging to the radio access bearer compared to the SDUs of other bearers<br>**Usage:** |
| >Allocation/Retention priority | O | | See below | **Desc.:** This IE specifies the relative importance compared to other Radio access bearers for allocation and retention of the Radio access bearer.<br>**Usage:**<br>If this IE is not received, the request is regarded as it cannot trigger the preemption process and it is vulnerable to the preemption process. |
| >Source Statistics descriptor | C-iftrafficCo nv-Stream | | ENUMERATED (speech, unknown, ? | **Desc.:** This IE specifies characteristics of the source of submitted SDUs<br>**Usage:** |

The SRNC selects a dedicated channel (DCH) or a common channel using the above service information. If the common channel is selected, the SRNC can select RACH or CPCH in response to a service request. In addition, a maximum bit rate and a guaranteed bit rate are used in selecting a minimum SF and a channelization code to be used by the common channel. That is, the SF and the channelization code to be used by the common channel are determined depending on the maximum bit rate and the guaranteed bit rate.

In addition, a traffic handling priority and a transfer delay are selected based on the characteristics of the physical channel, i.e., based on the sub-channel and the number of signatures.

When the UE allocated a channel by the SRNC performs a handover (or handoff), a DRNC, an RNC of a Node B newly accessed by the UE, and the SRNC may be changed. The SRNC and the DRNC are distinguished from the viewpoint of the UE. If the SRNC is connected to the UE not directly, but through the DRNC,, then the SRNC cannot personally select a channel and allocate the selected channel to the UE.

The reasons that the SRNC cannot personally allocate a channel to the UE are as follows.

First, channels allocated to a cell in the DRNC are determined by the DRNC, because the SRNC does not have information on the allocated common channel in the DRNC. For this reason, the SRNC cannot determine a common channel allocated to the cell in the DRNC.

Second, the DRNC or the CN does not have information on a service provided to the UE, so it is difficult to allocate a common channel to be used by the UE.

Thus, conventionally, when the SRNC is connected to the UE through the DRNC, i.e., when the UE performs a handover, the UE cannot be allocated a common channel.

## [SUBSTANTIAL MATTER OF THE INVENTION]

It is, therefore, an object of the present invention to provide a method in which a serving radio network controller (SRNC) shares service information provided from a core network, so that a drift radio network controller (DRNC) can allocate a common channel to a UE.

It is another object of the present invention to provide a method in which an SRNC provides a signaling message having service information received from a CN to a DRNC, so that the SRNC and the DRNC exchange information required in allocating a common channel to a specific UE handed over from the SRNC to the DRNC.

To achieve the above and other objects, there is provided a method for allocating a common channel in a W-CDMA mobile communication system having an SRNC, a DRNC different from the SRNC and a UE for performing a handover from the SRNC to the DRNC. The method comprises the steps of upon receiving service information on the data to be serviced to the UE from a CN, transmitting the service information message to the DRNC by the SRNC; and upon receiving the service information, allocating a common channel to the UE by the DRNC.

## [CONSTRUCTION AND OPERATION OF THE INVENTION]

A preferred embodiment of the present invention will be described herein below with reference to the accompanying drawings. In the following

description, well-known functions or constructions are not described in detail since they would obscure the invention in unnecessary detail.

The present invention provides two different embodiments for allocating a common channel to a UE in the case where an SRNC is different from a DRNC.

In a first embodiment, the SRNC transmits service information received from a CN to the DRNC. Upon receiving the service information, the DRNC selects a common channel based on the received service information and then allocates the selected common channel to the UE.

In a second embodiment, the SRNC selects a common channel service informant received from the CN and transmits information on the selected common channel to the DRNC. Upon receiving the information on the common channel, the DRNC allocates a common channel to the UE based on the received common channel information. In the first and second embodiments, the common channel selected by the SRNC may be identical to or different from the common channel selected by the DRNC.

A description of the first embodiment will be given below. As stated above, the service information transmitted from the CN to the SRNC is shown Tables 1A to 1C. In this embodiment, the SRNC should transmit the service information received from the CN to the DRNC. Thus, a definition of a message transmitted from the SRNC to the DRNC will be given.

The SRNC can transmit the service information to the DRNC by using a Common Transport Channel Resources Request message. The SRNC transmits some or all of the service information to the DRNC, using the Common Transport Channel Resources Request message. Upon receiving the Common Transport Channel Resources Request message, the DRNC detects the service information included in the received Common Transport Channel Resources Request message. The DRNC then allocates a common transport channel or a common physical channel to the UE based on the detected service information. Shown in Table 2 is a format of the Common Transport Channel Resources Request message according to the first embodiment of the present invention.

Table 2

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|---|---|---|---|---|---|
| Message Type | M | | 9.2.1.40 | | YES | Reject |
| Transaction ID | M | | 9.2.1.59 | | YES | Reject |
| D-RNTI | M | | 9.2.1.25 | | YES | Reject |
| C-ID | O | | 9.2.1.61 | Request a new transport bearer or to use an existing bearer for the user plane | YES | Reject |
| Transport Bearer Request Indicator | M | | 9.2.1.60 | Indicates the Iur transport bearer to be used for the user plane | YES | Reject |
| Transport Bearer ID | M | | | | | |
| RAB information | | 0.1 | | | | |
| Traffic Class | O | | | | | |
| RAB Asymmetry | O | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Indicator | | | | | | |
| Maximum Bit Rate | O | | | | | |
| Guaranteed Bit Rate | O | | | | | |
| Delivery Order | O | | | | | |
| Transfer Delay | O | | | | | |
| Traffic Handling priority | O | | | | | |
| Allocation/Retention priority | O | | | | | |
| Priority level | O | | | | | |
| Pre-emption Capability | O | | | | | |
| Pre-emption Mulnerability | O | | | | | |
| Queuing allowed | O | | | | | |

Table 2 shows some of the service information received from the CN. That is, in selecting service information required for selecting a common channel, the SRNC may select all of the information received from the CN or partially selects the information shown in Table 2.

The service information required by the DRNC in allocating a common channel to the UE includes the following parameters that should be transmitted from the SRNC to the DRNC.

(1) Maximum Bit Rate

The maximum bit rate represents a requirement for a maximum value of a bit rate of data to be transmitted/received over the common channel. Therefore, upon receiving the maximum bit rate, the DRNC should allocate the common

channel within a range not exceeding the maximum bit rate. This is because the maximum bit rate can become a criterion for determining a spreading factor (SF) indicating a bit rate a physical channel. Therefore, the maximum bit rate can become a criterion for selecting a random access channel (RACH) rather than a common packet channel (CPCH), for the SF<32.

(2) Guaranteed Bit Rate

The guaranteed bit rate represents a requirement for a guaranteed value of a bit rate of data to be transmitted/received over the common channel. Therefore, upon receiving the guaranteed bit rate, the DRNC should allocate the common channel within a range capable of guaranteeing the received guaranteed bit rate. For example, if the received guaranteed bit rate requires a spreading factor SF=16, the DRNC should allocate the CPCH rather than the RACH. In addition, the DRNC should allocate a CPCH set capable of supporting the SF=16 among CPCH sets. Likewise, even in the case of a forward access channel (FACH), the DRNC should allocate a secondary common control physical channel (S-CCPCH) capable of supporting the spreading factor SF=16.

The service information required by the DRNC in allocating a common channel to the UE includes Traffic Class, RAB Asymmetry Indicator, Delivery Order Transfer Delay, Traffic Handling Priority, and Allocation/Retention Priority parameters. These parameters can be used by the DRNC as criterions for selecting a common channel.

FIG. 1 illustrates a method for allocating a common channel to a UE in the case where an SRNC is different from a DRNC. Referring to FIG. 1, upon receiving an RAB parameter message with service information from a CN 30 (Step 100), an SRNC 20 determines service parameters to be transmitted to a DRNC 10 among the RAB parameter message. As mentioned above, however, the SRNC 20 can also select a specific common channel among available common channels. For example, in the case of an uplink, the SRNC 20 can previously determine (select) a common channel to be used among the RACH and the CPCH, and then transmit information of the determined common channel. In this case, the SRNC 20 must recognize whether the DRNC 10 provides the CPCH.

After determining the service parameters to be transmitted to the DRNC 10, the SRNC 20 transmits the determined service parameters and information on the type of the selected common channel to the DRNC 10 (Step 102). Of course, it is also possible to define a new procedure instead of using the Common Transport Channel Resources Request message.

Upon receiving the Common Transport Channel Resources Request message from the SRNC 20, the DRNC 10 determines a common channel to be used by the UE by detecting the service parameters included in the received Common Transport Channel Resources Request message and analyzing the detected service parameters (Step 103). The DRNC 10 can also determine the common channel to be allocated to the UE considering a current state of the

common channels in addition to the received information. That is, the DRNC 10 can select a common channel less frequently used by other UEs among a plurality of available common channels.

After determining the common channel to be allocated to the UE, the DRNC 10 transmits information on the determined common channel to the SRNC 20 (Step 104). The Common Transport Channel Resources Response message may include additional information such as information on a transport channel and a physical channel of the determined common channel, or its priority.

A procedure for transmitting the service parameters from the SRNC 20 to the DRNC 10 and a procedure for determining a common channel by the DRNC 10 using the service parameters received from the SRNC 20 will be described in detail with reference to FIGs. 2 and 3, respectively.

FIG. 2 illustrates a procedure for transmitting information required for allocating a channel by a DRNC using the service information transmitted from the SRNC 20 to the CN 30.

Referring to FIG. 2, in step 201, the SRNC 20 determines service parameters to be transmitted to the DRNC 10 among the RAB parameters. Here, the SRNC 20 can select partial service parameters shown in Table 2 from the service parameters included in the RAB parameter message, as the service parameters to be transmitted to the DRNC 10. For example, the service

parameters to may include the maximum bit rate or the guaranteed bit rate. The service parameters are service parameters decided to be necessarily considered by the DRNC 10 in determining the common channel.

In step 202, the SRNC 20 transmits the determined service parameters to the DRNC 10 along with an RNSAP (Radio Network Subsystem Application Part) signaling message. For example, the RNSAP signaling message used to transmit the service parameters may be a Common Transport Channel Resources Request message.

In step 203, the SRNC 20 receives an RNSAP Response signaling message from the DRNC 10 in response to the Common Transport Channel Resources Request message.

In step 204, the SRNC 20 detects information on a common channel to be allocated by the DRNC 10 to the UE included in the received RNSAP Response signaling message by analyzing the RNSAP Response signaling message, and transmits the detected common channel information to the UE using an RRC (Radio Resource Control) message.

In step 205, upon receiving an RRC Response message from the UE in response to the RRC message, the SRNC 20 starts exchanging data from the DRNC 10 with the CN 30, and then ends the procedure after the data exchange.

FIG. 3 illustrates a procedure for transmitting information required for allocating a common channel from the DRNC 10 to the SRNC 20.

Referring to FIG. 3, in step 301, the DRNC 10 receives an RNSAP signaling message from the SRNC 20. In step 302, the DRNC 10 detects and analyzes the received service parameters and then determines a common channel base on the service parameters. In the case of the uplink, the DRNC 10 selects a common channel to be used out of the RACH and the CPCH, and then determines the most preferred common channel among PRACHs currently available in the DRNC 10 or the CPCH sets for the respective cases, based on the received service parameters.. Alternatively, the DRNC 10 can also determine a common channel to be allocated to the UE considering a state of the common channels currently in use.

In step 303, the DRNC 10 transmits information on the determined common channel to the SRNC 20 along with an RNSAP Response signaling message, a response message replying to the RNSAP signaling message received from the SRNC 20.

In step 304, the DRNC 10 starts exchanging data from the SRNC 20 with the UE, and then ends the procedure after the data exchange.

In the second embodiment, the SRNC 20 selects the type of a common channel from an RAB parameter received from the CN 30, and then transmits the

service parameters and the information on the selected common channel to the DRNC 10. The DRNC 10 then allocates a common channel to the UE based on the type of the common channel and the service parameters, received from the SRNC 20. This procedure will be described in detail with reference to FIGs. 4 and 5.

FIG. 4 illustrates a procedure for transmitting information required for allocating a channel by the DRNC using the service information transmitted from the CN.

Upon receiving a RAB parameter message from the CN 30, the SRNC 20 determines service parameters to be transmitted to the DRNC 10 in step 401. Likewise, the service parameters to be determined may include some of the RAB parameter message. For example, the service parameters transmitted to the DRNC 10 may include the maximum bit rate or the guaranteed bit rate. Such service parameters are service parameters decided to be necessarily considered by the DRNC 10 in determining the common channel.

In step 402, the SRNC 20 selects the type of a common channel to be used based on the RAB parameters. Here, if the common channel to be allocated to the UE is a downlink common channel, the step 420 can be omitted because only one type of the common channel is defined currently. This is because the currently defined downlink common channel includes only the FACH. However, the currently defined uplink common channel includes the RACH and the CPCH.

Therefore, the SRNC 20 can first select a preferred common channel out of the two common channels, based on the RAB parameters, and then send a request for the selected common channel to the DRNC 10. Here, the SRNC 20 must previously recognize whether the DRNC 10 supports the CPCH.

In step 403, the SRNC 20 transmits the determine service parameters and the common channel information to the DRNC 10 along with the RNSAP signaling message. For example, the RNSAP signaling message used in transmitting the service parameters and the common channel information may be a Common Transport Channel Resources Request message.

In step 404, the SRNC 20 receives an RNSAP Response signaling message, a response message answering to the RNSAP signaling message, from the DRNC 10. The received RNSAP Response signaling message, i.e., a Common Transport Channel Resources Response message, includes information on the common channel determined by the DRNC 10.

In step 405, the SRNC 20 detects information on the common channel determined by the DRNC by analyzing the RNSAP Response signaling message, and then transmits the detected information to the UE along with an RRC message.

In step 406, upon receiving an RRC Response message, a response message replying to the transmitted RRC message, from the UE, the SRNC 20

starts exchanging data with the CN 30 and the DRNC 10, and then ends the procedure after the data exchange.

FIG. 5 illustrates a procedure for transmitting information required for allocating a common channel from the DRNC to the SRNC.

Referring to FIG. 5, in step 501, the DRNC 10 receives an RNSAP signaling message from the SRNC 20. The DRNC 10 detects service parameters and the type of the common channel from the RNSAP signaling message.

In step 502, the DRNC 10 determines whether the type of the common channel is an RACH. Thus, the DRNC 10 determines whether the type of the common channel allocated by the SRNC 20 is an RACH. As the result of the determination, if the type of the common channel is the RACH, the DRNC 10 proceeds to step 503. Otherwise, if the type of the common channel is the CPCH, then the DRNC 10 proceeds to step 506. In addition, if the common channel to be allocated to the UE is a downlink common channel, the SRNC 20 is not required to separately determine the type of the common channel as shown in FIGs. 2 and 3, because the downlink common channel includes only the FACH.

In step 503, the DRNC 10 determines a PRACH based on the detected service parameters. Here, the DRNC 10 determines a PRACH among PRACHs defined in the DRNC 10 based on the service parameters detected from the RAB parameter message. Further, the DRNC 10 determines a PRACH for the UE

considering a state of the PRACHs currently in use.

In step 504, the DRNC 10 transmits information on the determined PRACH and its associated RACH to the SRNC 20 along with an RNSAP Response message, i.e., the Common Transport Channel Resources Response message. In step 505, the DRNC 10 starts exchanging data with the UE and the SRNC 20, and then ends the procedure after the data exchange.

The DRNC 10 determines a CPCH set based on the detected service parameters in step 506. Here, the DRNC 10 determines a preferred CPCH set among CPCH sets defined in the DRNC 10, based on the detected service parameters. Alternatively, the DRNC 10 can also select a CPCH set to be allocated to the UE considering a state of the CPCH sets currently in use. Since the CPCH sets have different characteristics, the DRNC 10 can determine a preferred CPCH set considering the maximum data rate.

In step 507, the DRNC 10 transmits information on the determined common channel to the SRNC 20 along with an RNSAP Response signaling message. In step 508, the DRNC 10 starts receiving a CPCH from the UE and transmitting the received CPCH to the SRNC 20, and then ends the procedure after the data transmission.

Next, a detailed description will be made of a method for selecting the CPCH among the common channels and then allocating the selected CPCH.

In general, as for the CPCH, a plurality of CPCH sets are included in the DRNC, and the DRNC allocates different CPCH sets according to the services. In this case, in order to determine a CPCH set proper for a specific UE, the DRNC should be provided with information on the service requested or received by the UE from the SRNC. Shown in Table 3 is information on the CPCH sets included in the DRNC.

Table 3

| CPCH Set | Minimum SF | Num of PCPCH | TTI | Channel Coding | Num of Signatures |
|---|---|---|---|---|---|
| CPCH Set 1 | SF4 | 4 | 10ms | 1/3 turbo coding | 8 |
| CPCH Set 2 | SF8 | 8 | 10ms | 1/3 turbo coding | 8 |
| CPCH Set 3 | SF8 | 16 | 20ms | 1/2 convolution coding | 16 |
| CPCH Set 4 | SF16 | 32 | 20ms | 1/2 convolution coding | 16 |

Referring to Table 3, the DRNC has 4 CPCH sets included in its cell, and the CPCH sets have different information on the minimum SF value, the number of physical common packet channels (PCPCHs), the TTI value of transport format set information, and the number of signatures available for the CPCH set. As a result, the UEs allocated different CPCH sets are provided with the services having different data rates.

The DRNC uses the maximum bit rate included in the RNSAP signaling message received from the SRNC in order to allocate a specific CPCH set to a specific UE among the CPCH sets. Upon receiving the maximum bit rate, the DRNC selects a CPCH set capable of supporting the received maximum bit rate

among the CPCH sets currently included in the DRNC, and transmits information on the selected CPCH set to the SRNC.

Table 4

| SF | Channel Bit Rate | Data Bit Rate (1/2 coding) | Data Bit Rate (1/3 coding) |
|---|---|---|---|
| 4 | 960Kbps | 480Kbps | 320Kbps |
| 8 | 480Kbps | 240Kbps | 160Kbps |
| 16 | 240Kbps | 120Kbps | 80Kbps |
| 32 | 120Kbps | 60Kbps | 40Kbps |
| 64 | 60Kbps | 30Kbps | 20Kbps |
| 128 | 30Kbps | 15Kbps | 10Kbps |
| 256 | 15Kbps | 7.5Kbps | 5Kbps |
| ... | ... | ... | ... |

Table 4 shows the data bit rates available for the respective SF values.

Table 5

| Max Bit Rate | Min SF with 1/2 coding | Min SF with 1/3 coding | Available CPCH sets |
|---|---|---|---|
| 5.15Kbps | 256 | 128 | CPCH set 1, 2, 3, 4 |
| 12.2Kbps | 128 | 64 | CPCH set 1, 2, 3, 4 |
| 14.4Kbps | 64 | 64 | CPCH set 1, 2, 3, 4 |
| 28.8Kbps | 64 or 32 | 32 | CPCH set 1, 2, 3, 4 |
| 57.6Kbps | 32 or 16 | 32 | CPCH set 1, 2, 3, 4 |
| 32Kbps | 32 | 32 | CPCH set 1, 2, 3, 4 |
| 64Kbps | 16 | 32 | CPCH set 1, 2, 3, 4 |

| | | | |
|---|---|---|---|
| 128Kbps | 8 | 8 | CPCH set 1, 2, 3 |
| 384Kbps | 4 | 4 | CPCH set 1 |
| . . . | . . . | . . . | . . . |

Table 5 shows relationships between the maximum bit rates and associated CPCH sets available for the maximum bit rates, based on Tables 3 and 4. For example, the CPCH set 4 is larger than the CPCH set 3, the CPCH set 3 is larger than the CPCH set 2, and the CPCH set 2 is larger than the CPCH set1 in the number of available CPCHs. Therefore, when the CPCH sets can be simultaneously allocated, it is possible to set an allocation probability of the CPCH set 2 to be higher than that of the CPCH set 1, an allocation probability of the CPCH set 3 to be higher than that of the CPCH set 2, and an allocation probability of the CPCH set 4 to be higher than that of the CPCH set 3. That is, in FIG. 5, it is preferable to allocate the CPCH set 3 to the UE with the maximum bit rate of 128Kbps. In addition, it is preferable to allocate the CPCH set 4 to the UE with the maximum bit rate of 64Kbps.

That is, if the SRNC designates a service parameter for a specific UE among the service parameters included in the RAB parameter message received from the CN as the maximum bit rate in an RNSAP signaling message for common channel allocation and transmits the RNSAP signaling message to the DRNC, then the DRNC determines a CPCH set proper for the maximum bit rate parameter in the RNSAP signaling message among the CPCH sets previously included in the DRNC, and then transmits information on the determined CPCH set to the SRNC. Here, a CPCH set ID can be used for the information on the

determined CPCH set. The SRNC transmits the received CPCH set ID to the UE using an RRC message.

The UE then recognizes information on the CPCH set through system information received over a broadcast channel (BCH) from the corresponding cell, and then initiates transmission of the CPCH signal using the received CPCH set information.

Further, the DRNC can transmit the whole information on the CPCH set to the SRNC along with a CPCH set ID for the determined CPCH. In this case, the SRNC can receive the whole information on the CPCH set for the UE through an RRC message. Therefore, the UE can recognize information on the CPCH set even without receiving the BCH information. Specifically, when a UE transitions from a CELL_DCH state to a CELL_FACH state, the UE can receive information on the common channel to be used in the CELL_FACH state, directly through RRC message not through the BCH.

In addition, when the DRNC transmits only specific information of the information on the CPCH set to the SRNC along with the CPCH set ID, the SRNC transmits the information on the CPCH set, received from the DRNC, to the UE through the RRC message, and the UE constructs a CPCH by preferentially applying the received information to overlapped information of the CPCH set information received over the BCH. For example, if the number of signatures available for a specific CPCH set is 16, the DRNC can allow the UE

to use some of the 16 available signatures. For example, the DRNC may provide the SRNC with information indicating that only 8 signatures are available for the UE, and upon receiving this information from the SRNC, the UE can access the CPCH set using only the allowed signatures. In this case, the DRNC can control the UE's right to use the CPCH set considering the current state of the cell.

The method for transmitting the CPCH set-related information can be equally applied even to the RACH and the FACH. The CPCH set can also be equally applied to the PRACH and the FACH, so the present invention is not restrictive to the CPCH, but can be applied to all of the common channels.

**[EFFECTS OF THE INVENTION]**

As described above, to select a common channel, the SRNC transmits information stored therein to the DRNC so that the DRNC may determine a common channel proper to the UE, thus increasing utilization efficiency of the common channel and providing various services. In particular, the CPCHs are given different characteristics according to CPCH sets, and then, the DRNC sets an effective CPCH set according to service requests from the UE, thus providing a high-quality service.

**[PATENT CLAIMS]**

1. A method for allocating a common channel in a W-CDMA mobile communication system having a serving radio network controller (SRNC), a drift radio network controller (DRNC) different from said SRNC and a UE for performing a handover from said SRNC to said DRNC, comprising the steps of:

upon receiving service information on the data to be serviced to said UE from a core network (CN), transmitting the service information message to said DRNC by said SRNC; and

upon receiving the service information, allocating a common channel to said UE by said DRNC.

2. The method as claimed in claim 1, wherein said service information message is a common transport channel resources request message.

3. The method as claimed in claim 1, further comprising the step of receiving information on the allocated common channel from said DRNC and transmitting the information to said UE by said SRNC.

4. The method as claimed in claim 3, wherein the information on the common channel is transmitted over a broadcast channel (BCH).

5. The method as claimed in claim 3, wherein the information on the common channel is transmitted through an RRC message.

6. A method for allocating a common channel in a W-CDMA mobile communication system having an SRNC, a DRNC different from said SRNC and a UE for performing a handover from said SRNC to said DRNC, comprising the steps of:

upon receiving service information on the data to be serviced to said UE from a CN, allocating a common channel based on the service information and transmitting information on the allocated common channel to said DRNC by said SRNC; and

upon receiving the information on the allocated common channel, allocating the common channel to said UE by said DRNC.

7. The method as claimed in claim 6, wherein said service information message is a common transport channel resources request message.

8. The method as claimed in claim 6, further comprising the step of receiving information on the allocated common channel from said DRNC and transmitting the information to said UE by said SRNC.

9. The method as claimed in claim 8, wherein the information on the common channel is transmitted over a BCH.

10. The method as claimed in claim 8, wherein the information on the common channel is transmitted through an RRC message.

11. A method for allocating a common channel in a W-CDMA mobile communication system having an SRNC. a DRNC different from said SRNC and a UE for performing a handover from said SRNC to said DRNC. comprising the steps of:

upon receiving service information on the data to be serviced to said UE from a CN, allocating a common channel based on the service information and transmitting information on the allocated common channel to said DRNC by said SRNC; and

receiving the information on the allocated common channel, allocating a new common channel based on the received information on the common channel if said common channel is being used among available common channels. allocating said common channel to said UE by said DRNC if said common channel is not being used.

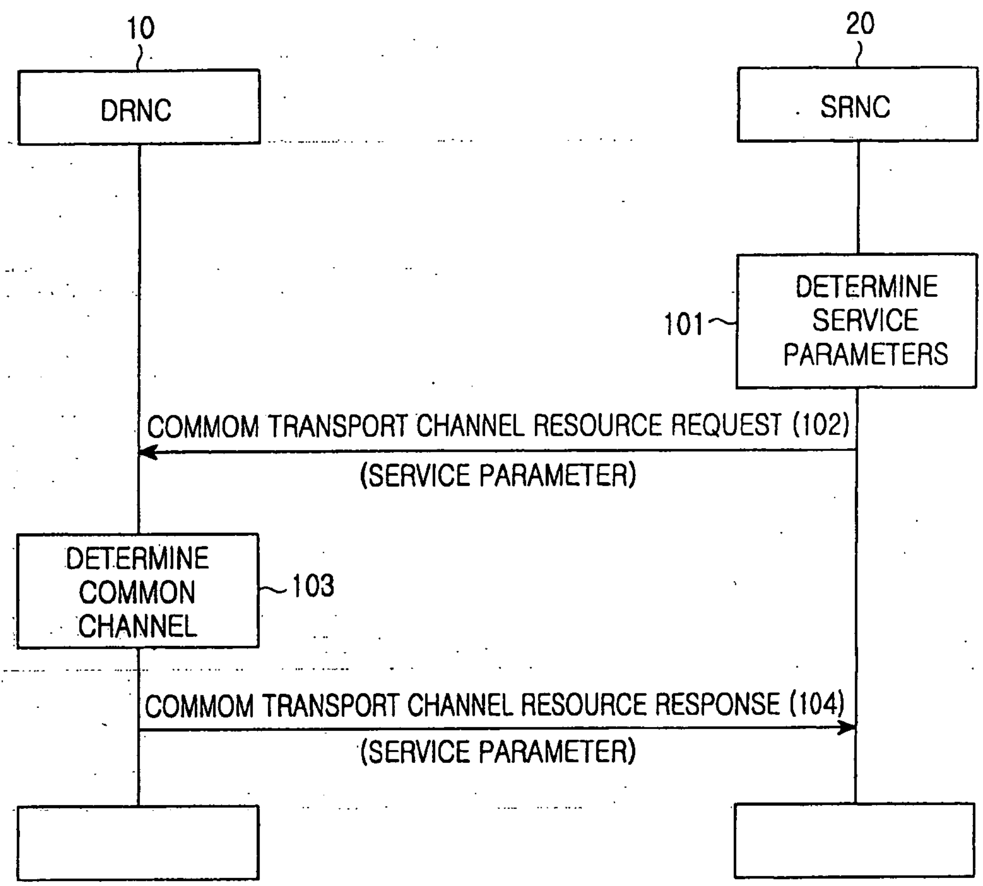
10
20
DRNC
SRNC
DETERMINE
SERVICE
PARAMETERS
101
COMMOM TRANSPORT CHANNEL RESOURCE REQUEST (102)
(SERVICE PARAMETER)
DETERMINE
COMMON
CHANNEL
103
COMMOM TRANSPORT CHANNEL RESOURCE RESPONSE (104)
(SERVICE PARAMETER)

FIG.1

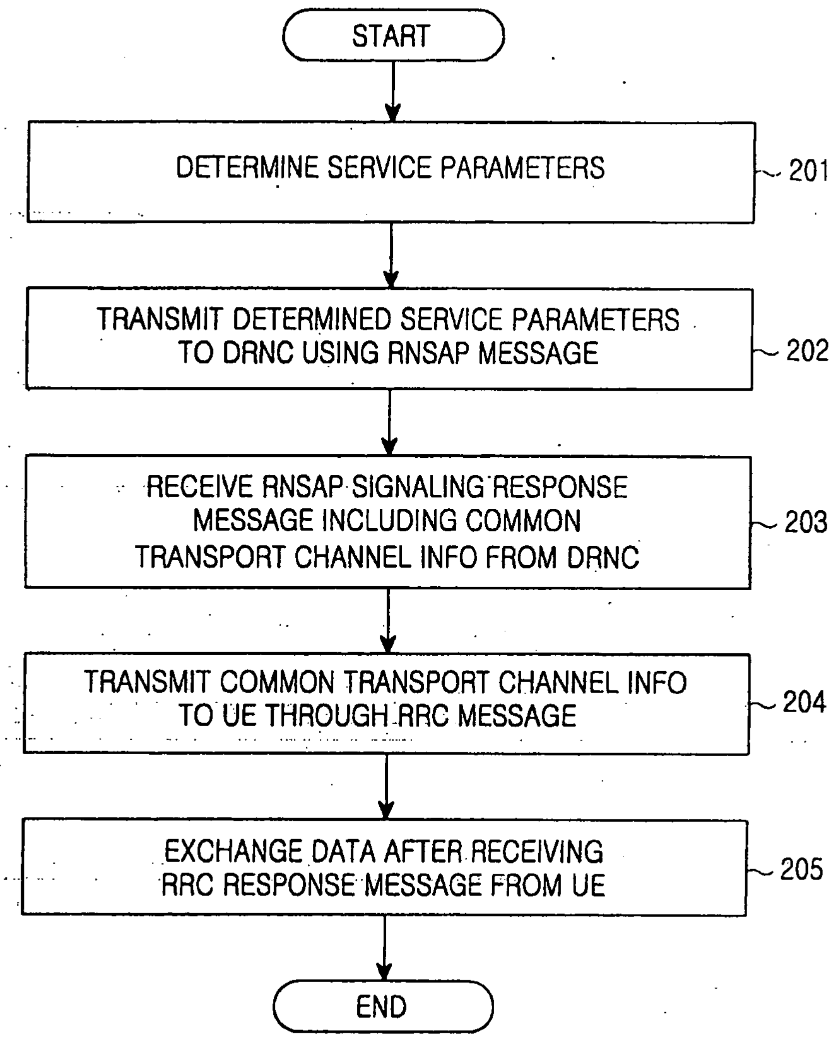
START
DETERMINE SERVICE PARAMETERS
201
TRANSMIT DETERMINED SERVICE PARAMETERS TO DRNC USING RNSAP MESSAGE
202
RECEIVE RNSAP SIGNALING RESPONSE MESSAGE INCLUDING COMMON TRANSPORT CHANNEL INFO FROM DRNC
203
TRANSMIT COMMON TRANSPORT CHANNEL INFO TO UE THROUGH RRC MESSAGE
204
EXCHANGE DATA AFTER RECEIVING RRC RESPONSE MESSAGE FROM UE
205
END

FIG.2

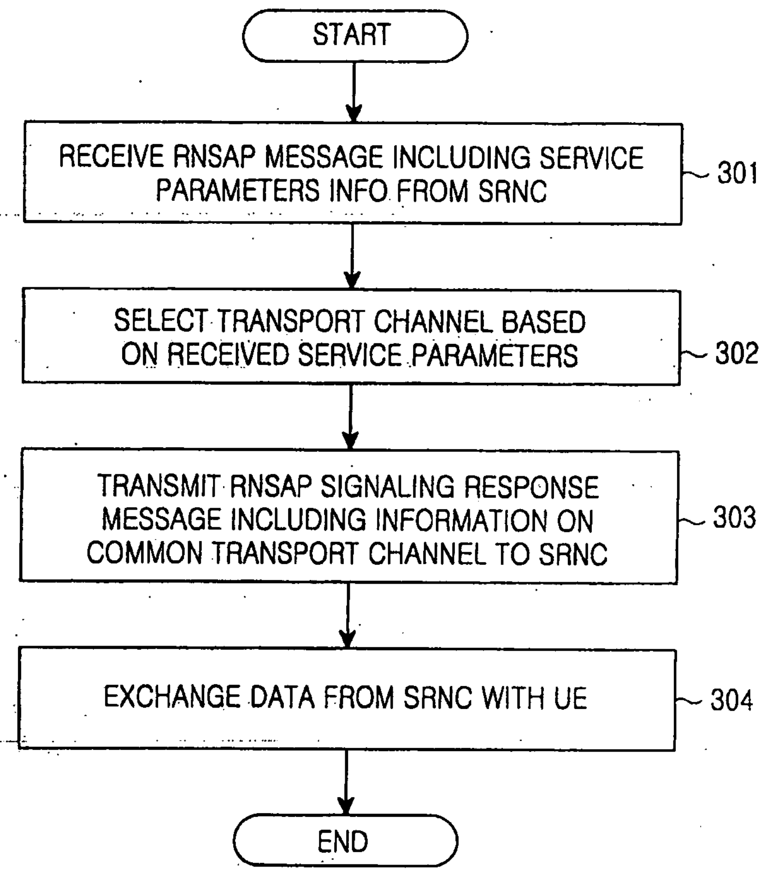
START
RECEIVE RNSAP MESSAGE INCLUDING SERVICE PARAMETERS INFO FROM SRNC
301
SELECT TRANSPORT CHANNEL BASED ON RECEIVED SERVICE PARAMETERS
302
TRANSMIT RNSAP SIGNALING RESPONSE MESSAGE INCLUDING INFORMATION ON COMMON TRANSPORT CHANNEL TO SRNC
303
EXCHANGE DATA FROM SRNC WITH UE
304
END

FIG.3

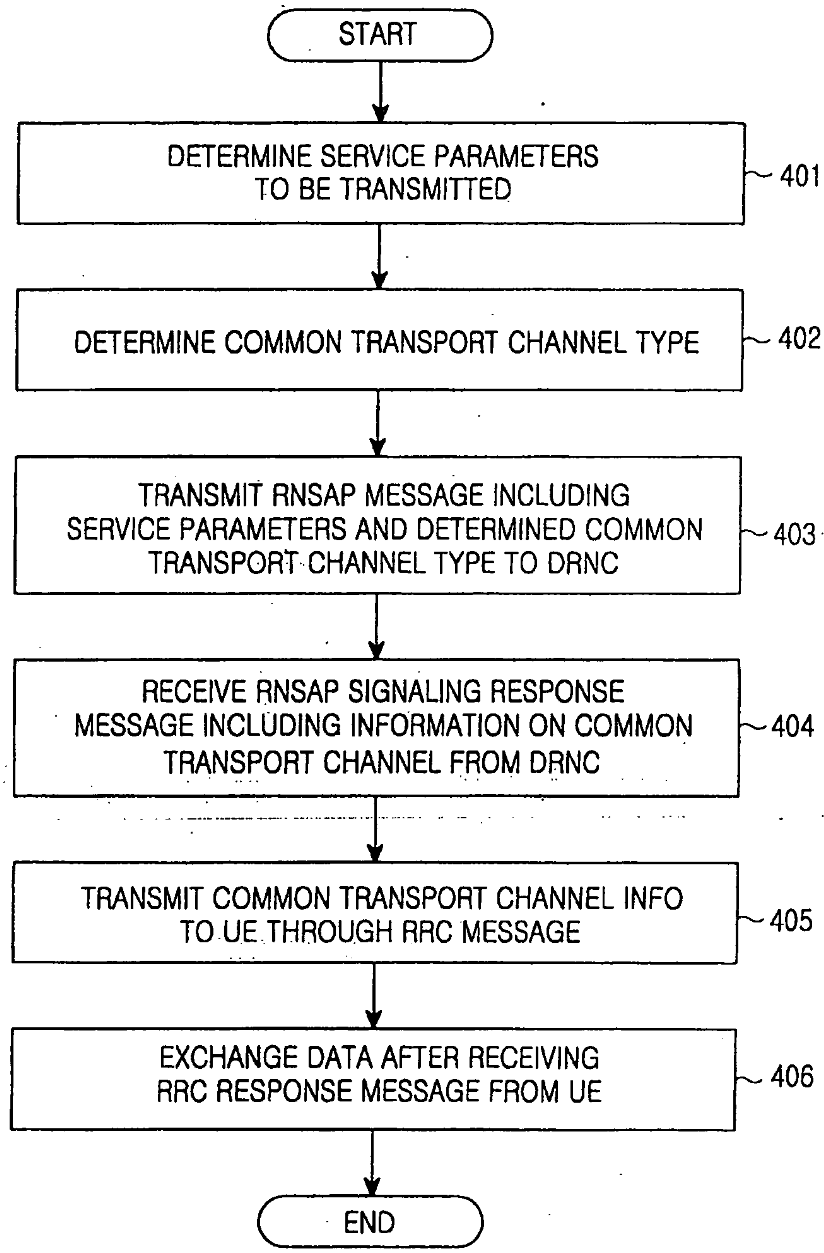
START
DETERMINE SERVICE PARAMETERS TO BE TRANSMITTED
401
DETERMINE COMMON TRANSPORT CHANNEL TYPE
402
TRANSMIT RNSAP MESSAGE INCLUDING SERVICE PARAMETERS AND DETERMINED COMMON TRANSPORT CHANNEL TYPE TO DRNC
403
RECEIVE RNSAP SIGNALING RESPONSE MESSAGE INCLUDING INFORMATION ON COMMON TRANSPORT CHANNEL FROM DRNC
404
TRANSMIT COMMON TRANSPORT CHANNEL INFO TO UE THROUGH RRC MESSAGE
405
EXCHANGE DATA AFTER RECEIVING RRC RESPONSE MESSAGE FROM UE
406
END

FIG.4

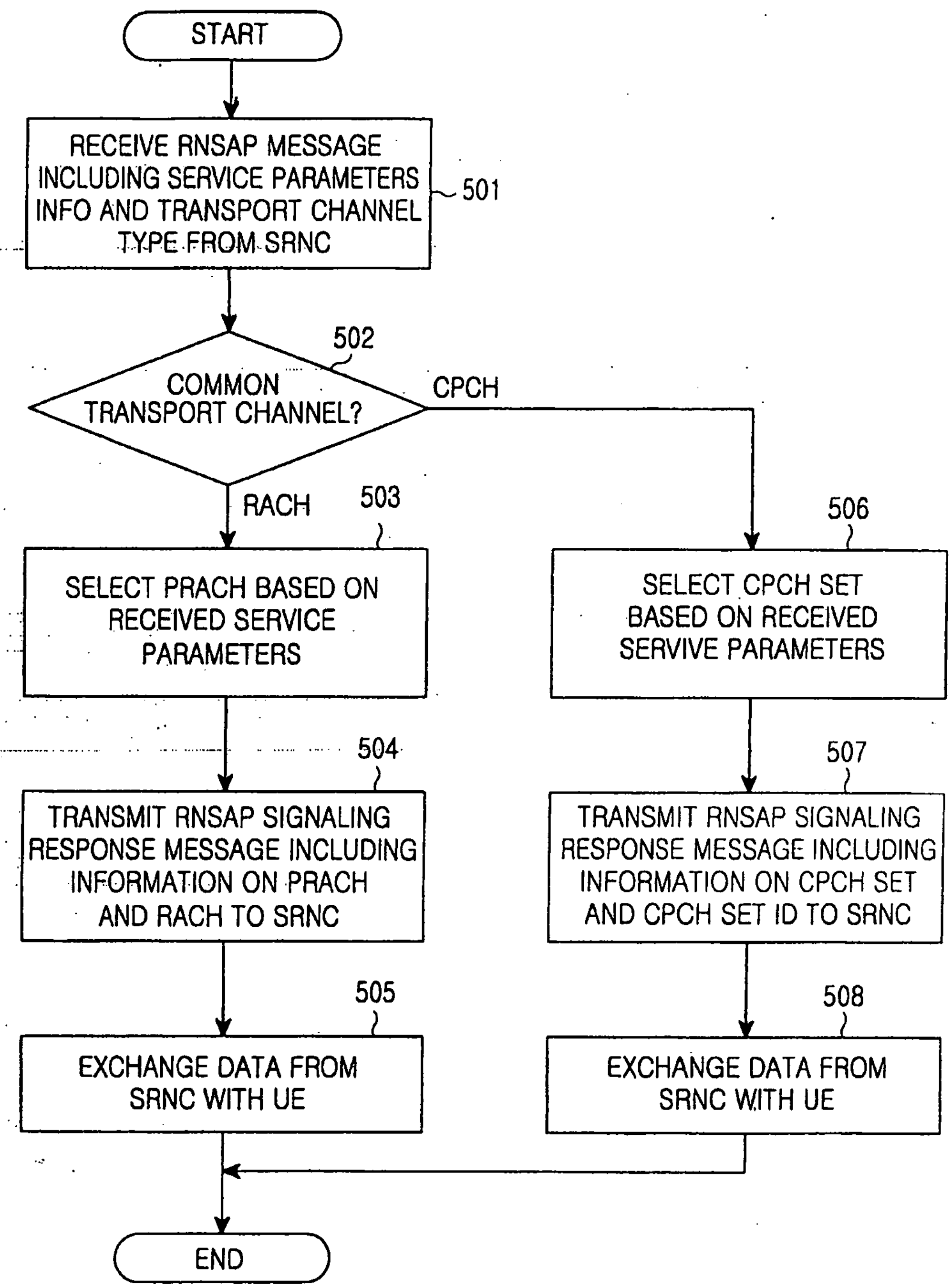
START
RECEIVE RNSAP MESSAGE INCLUDING SERVICE PARAMETERS INFO AND TRANSPORT CHANNEL TYPE FROM SRNC
501
COMMON TRANSPORT CHANNEL?
502
CPCH
RACH
503
SELECT PRACH BASED ON RECEIVED SERVICE PARAMETERS
506
SELECT CPCH SET BASED ON RECEIVED SERVIVE PARAMETERS
504
TRANSMIT RNSAP SIGNALING RESPONSE MESSAGE INCLUDING INFORMATION ON PRACH AND RACH TO SRNC
507
TRANSMIT RNSAP SIGNALING RESPONSE MESSAGE INCLUDING INFORMATION ON CPCH SET AND CPCH SET ID TO SRNC
505
EXCHANGE DATA FROM SRNC WITH UE
508
EXCHANGE DATA FROM SRNC WITH UE
END

FIG.5